Field-Stuart-Haas Analysis

Charged Particle Data

Select "clean" region

- Zero or one vertex
- $|z_c - z_v| < 2$ cm, $|$CTC $d_0| < 1$ cm
- Require $P_T > 0.5$ GeV, $|\eta| < 1$
- Assume a uniform track finding efficiency of 92%
- Errors include both statistical and correlated systematic uncertainties

Uncorrected data

WYSIWYG

What you see is what you get.
Almost!

Look only at the charged particles measured by the CTC.

compare

QCD Monte-Carlo

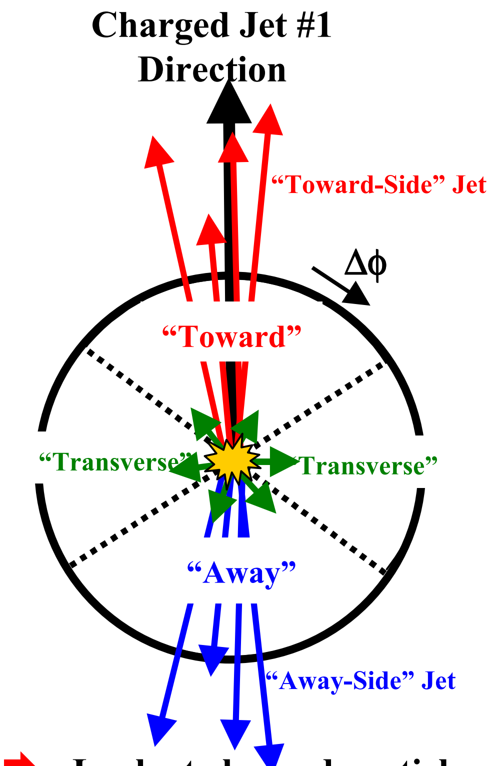
Make efficiency corrections

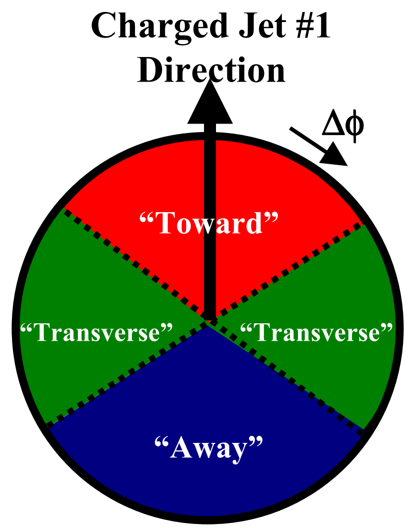
- Require $P_T > 0.5$ GeV, $|\eta| < 1$
- Make an 8% correction for the track finding efficiency
- Errors (statistical plus systematic) of around 5%

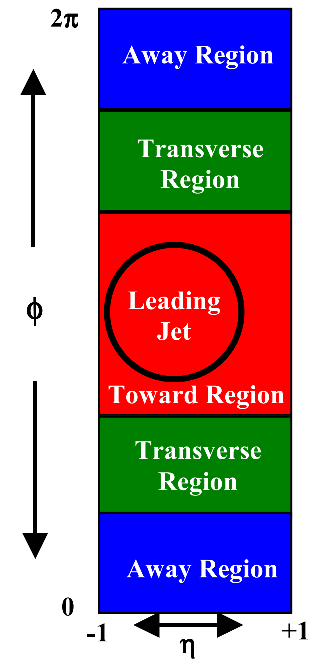
Corrected theory

Small Corrections!

Charged Particle $\Delta\phi$ Correlations

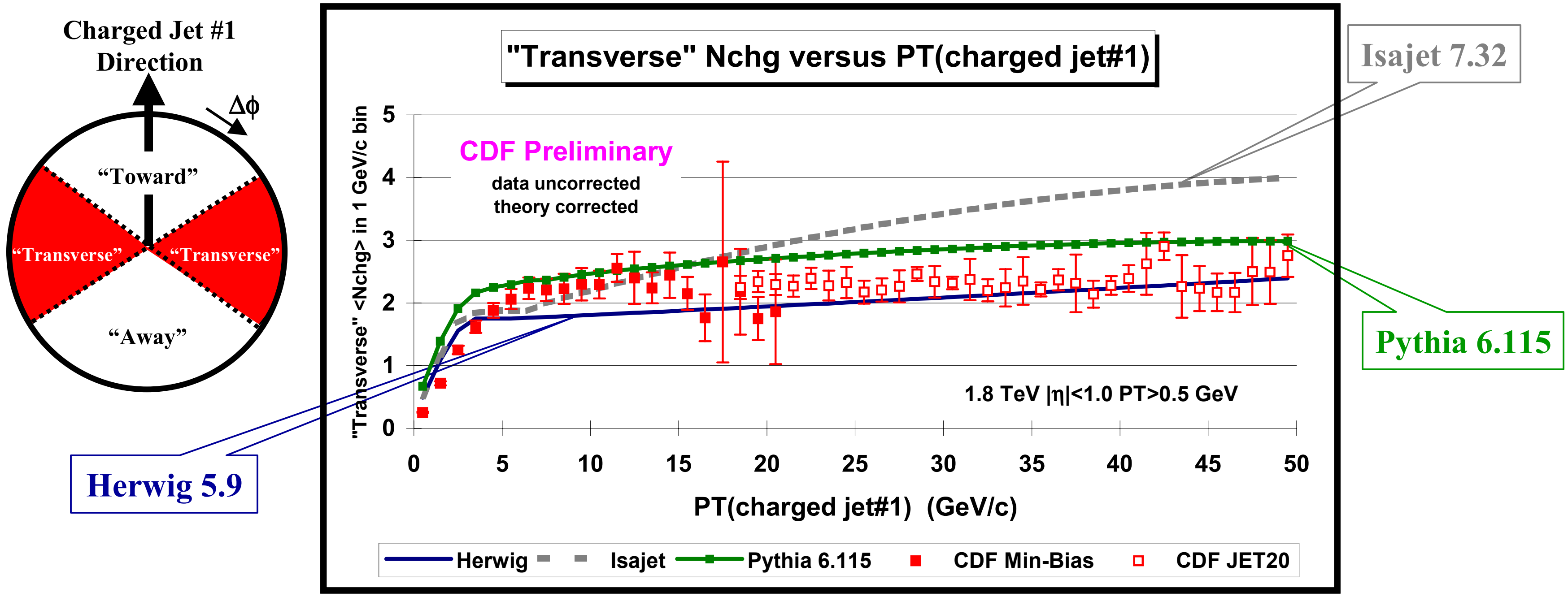






- **Look at charged particle correlations in the azimuthal angle $\Delta\phi$ relative to the leading charged particle jet.**
- **Define $|\Delta\phi| < 60^{o}$ as "Toward", $60^{o} < |\Delta\phi| < 120^{o}$ as "Transverse", and $|\Delta\phi| > 120^{o}$ as "Away".**
- **All three regions have the same size in η-ϕ space, $\Delta\eta \mathrm{x} \Delta\phi = 2\mathrm{x}120^{o} = 4\pi/3$.**

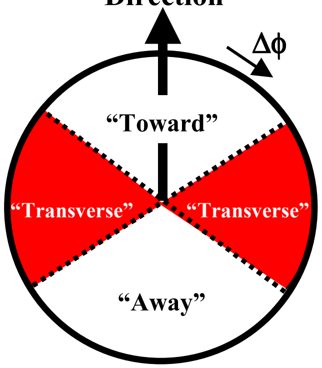
"Transverse" Nchg versus P_T(chgjet#1)

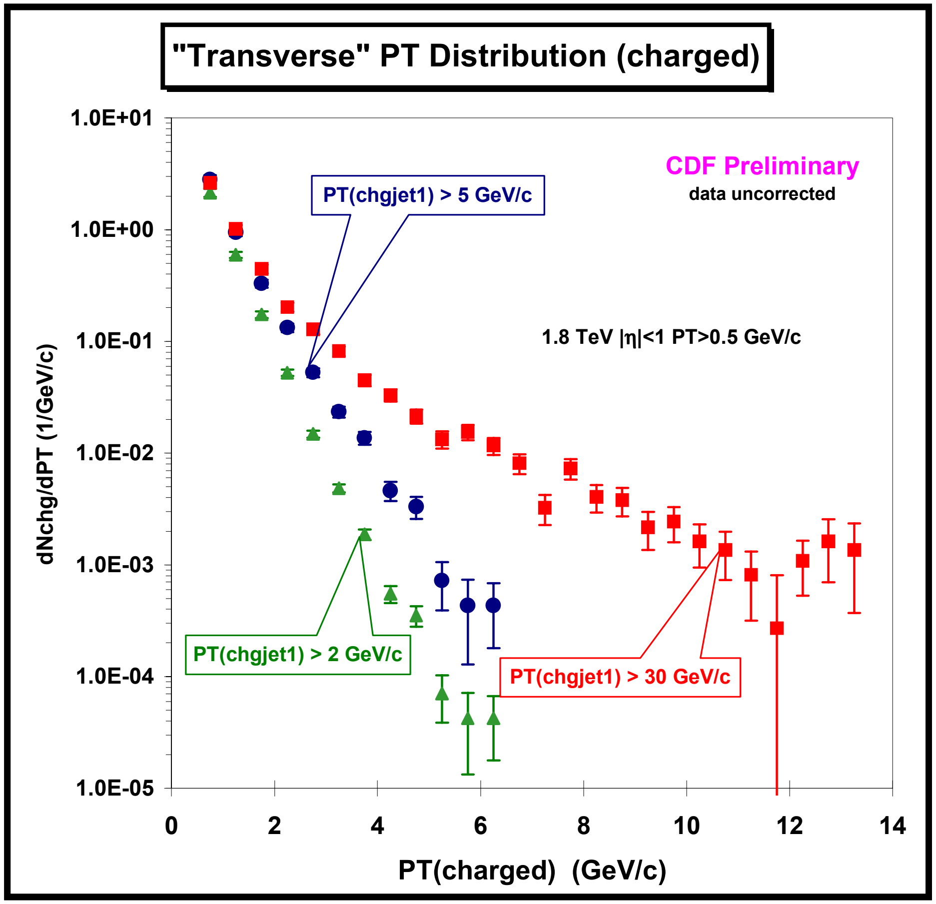


Blessed on 11/3/99

- Plot shows the "Transverse" $<N_{chg}>$ versus P_T(chgjet#1) compared to the the QCD hard scattering predictions of Herwig 5.9, Isajet 7.32, and Pythia 6.115 (default parameters with P_T(hard)>3 GeV/c).
- Only charged particles with $|\eta| < 1$ and $P_T > 0.5$ GeV are included and the QCD Monte-Carlo predictions have been corrected for efficiency.

"Transverse" P_T Distribution

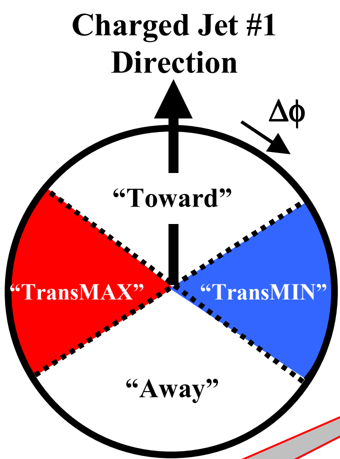




- Plot shows the P_T distribution of the "Transverse" $<N_{chg}>$, dN_{chg}/dP_T. The integral of dN_{chg}/dP_T is the "Transverse" $<N_{chg}>$.
- The triangle and circle (square) points are the Min-Bias (JET20) data. The errors on the (*uncorrected*) data include both statistical and correlated systematic uncertainties.

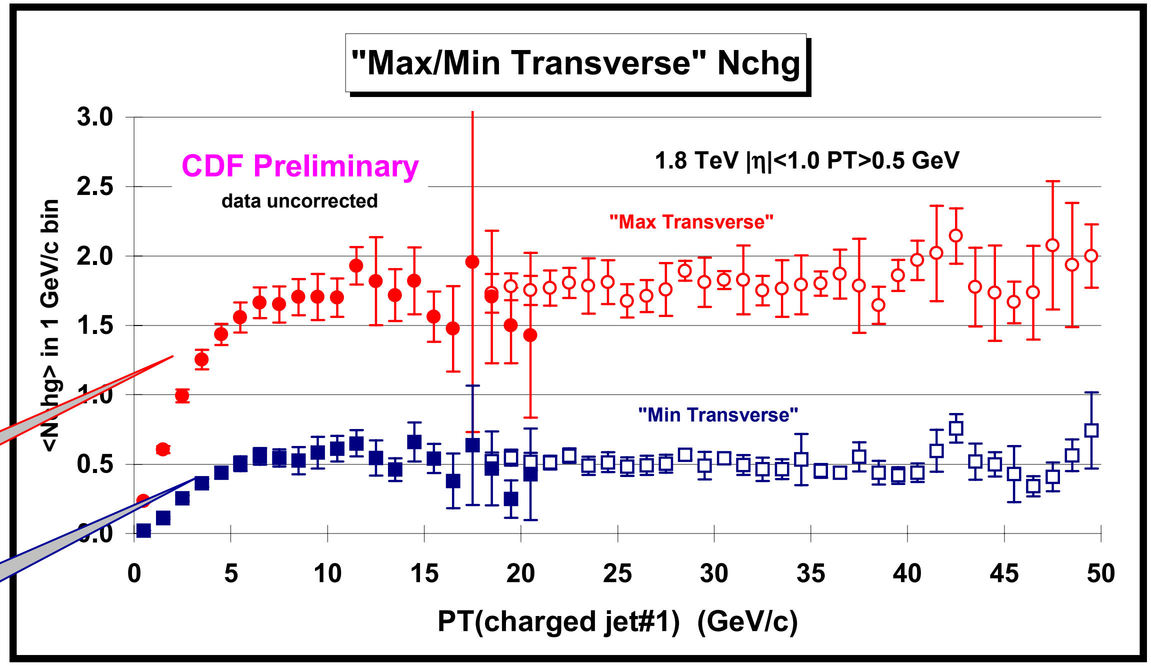
Blessed on 5/4/01

“Max/Min Transverse” Nchg versus P_T(chgjet#1)



“TransMAX”

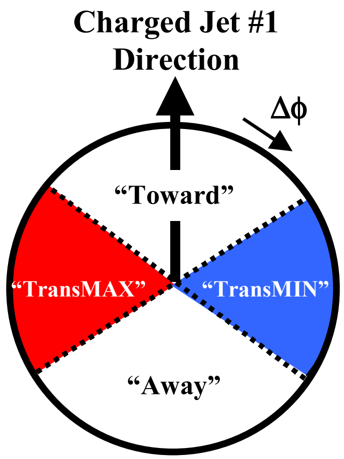
“TransMIN”



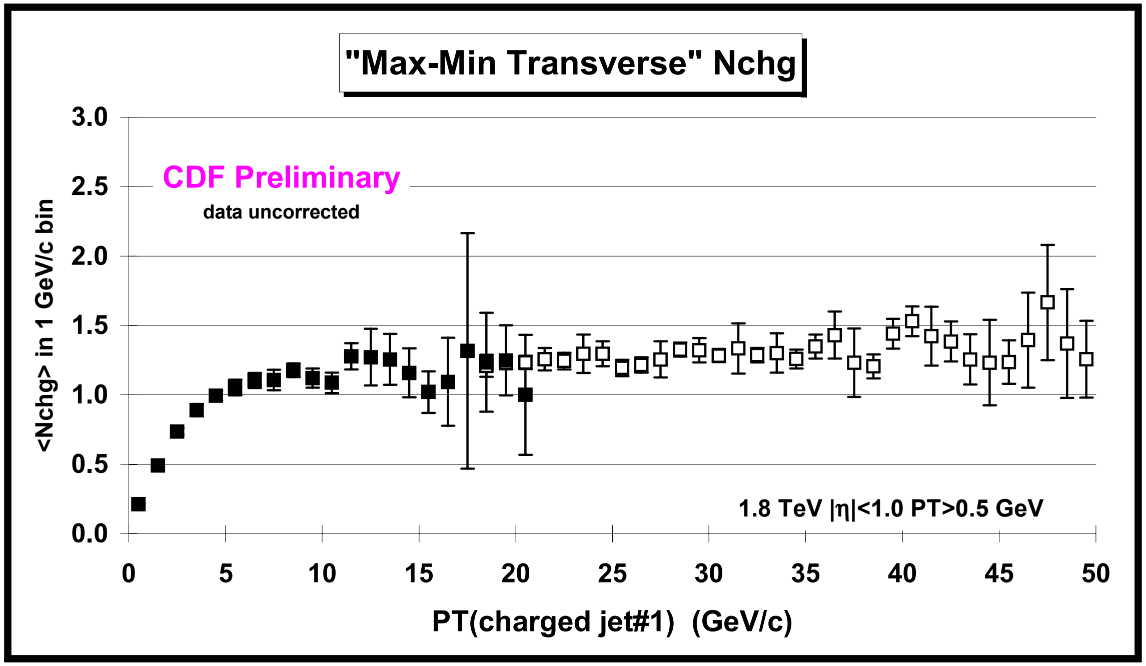
To be Blessed

- Define “TransMAX” and “TransMIN” to be the maximum and minimum of the region $60^o<\Delta\phi<120^o$ ($60^o<-\Delta\phi<120^o$) on an event by event basis. The overall “transverse” region is the sum of “TransMAX” and “TransMIN”. The plot shows the average “TransMAX” N_{chg} and “TransMIN” N_{chg} versus P_T(charged jet#1).
- The solid (open) points are the Min-Bias (JET20) data. The errors on the (*uncorrected*) data include both statistical and correlated systematic uncertainties.

"Max-Min Transverse" Nchg versus P_T(chgjet#1)



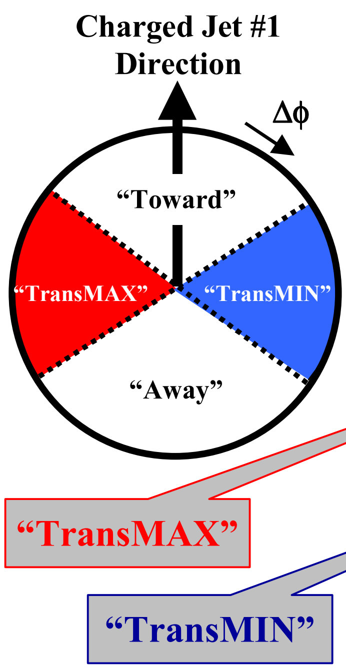
TransMAX-TransMIN

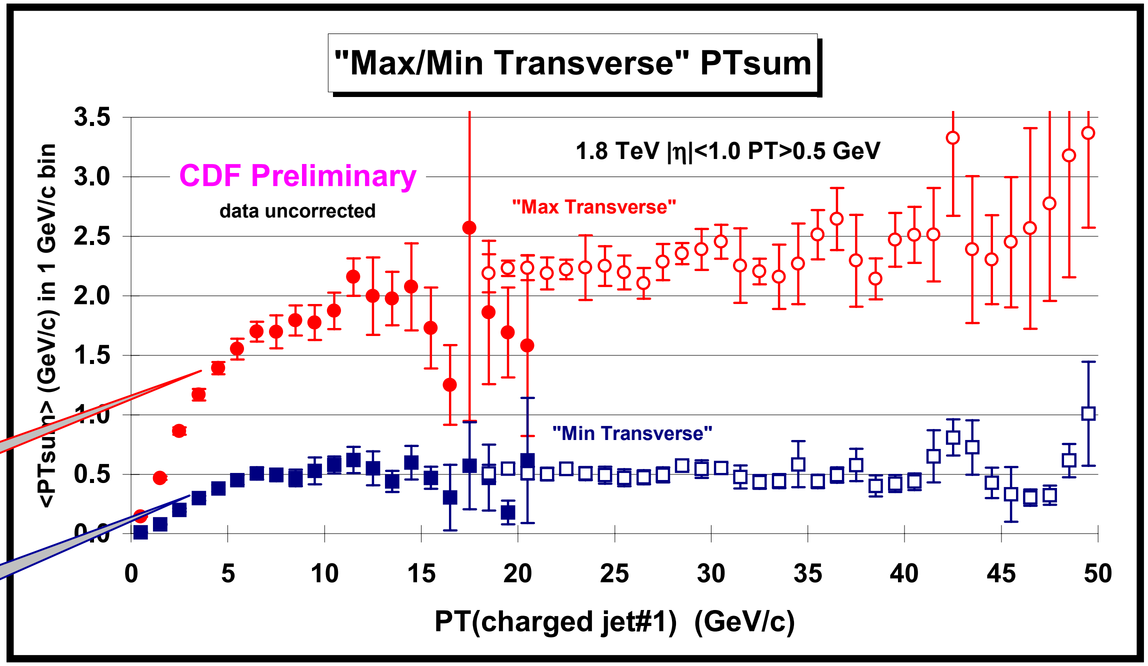


To be Blessed

- **Define "TransMAX" and "TransMIN" to be the maximum and minimum of the region $60^o<\Delta\phi<120^o$ ($60^o<-\Delta\phi<120^o$) on an event by event basis. The plot shows the average difference between the "TransMAX" N_{chg} and the "TransMIN" N_{chg} versus P_T(charged jet#1).**
- **The solid (open) points are the Min-Bias (JET20) data. The errors on the (*uncorrected*) data include both statistical and correlated systematic uncertainties.**

"Max/Min Transverse" PTsum versus P_T(chgjet#1)

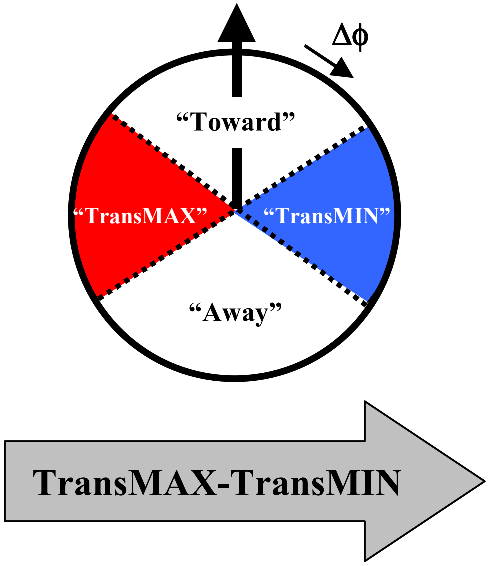


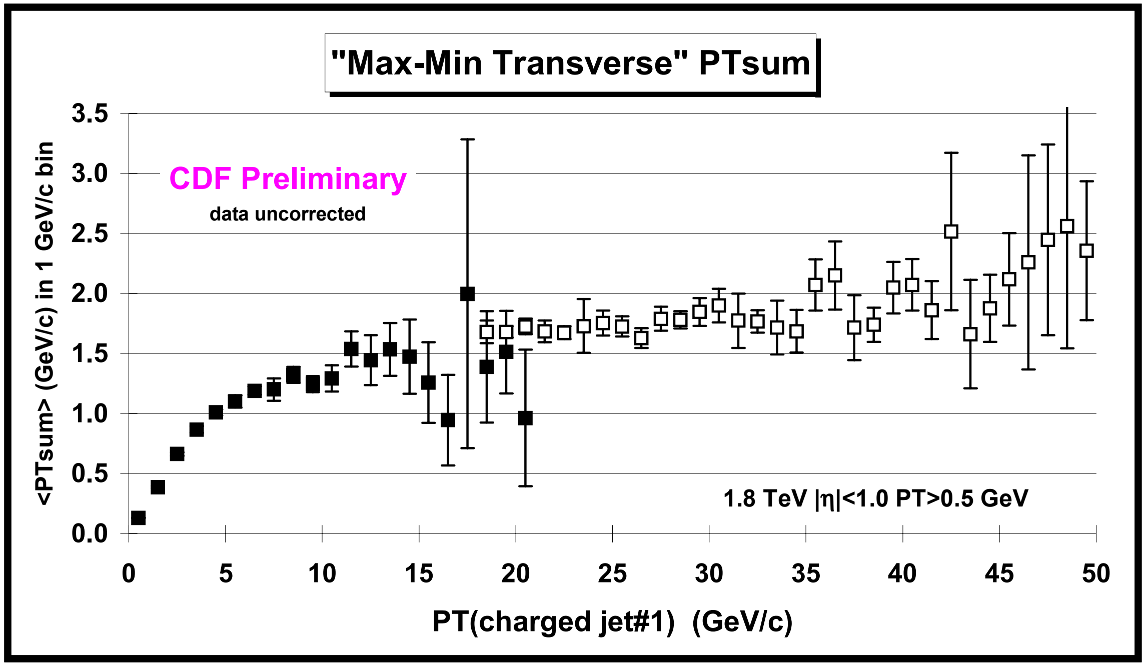


To be Blessed

- Define "TransMAX" and "TransMIN" to be the maximum and minimum of the region $60^o<\Delta\phi<120^o$ ($60^o<-\Delta\phi<120^o$) on an event by event basis. The overall "transverse" region is the sum of "TransMAX" and "TransMIN". The plot shows the average "TransMAX" PT_{sum} and "TransMIN" PT_{sum} versus P_T(charged jet#1)..
- The solid (open) points are the Min-Bias (JET20) data. The errors on the (*uncorrected*) data include both statistical and correlated systematic uncertainties.

"Max-Min Transverse" PTsum versus P_T(chgjet#1)

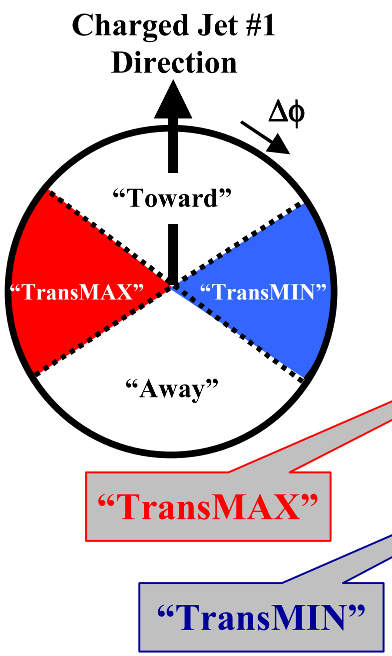


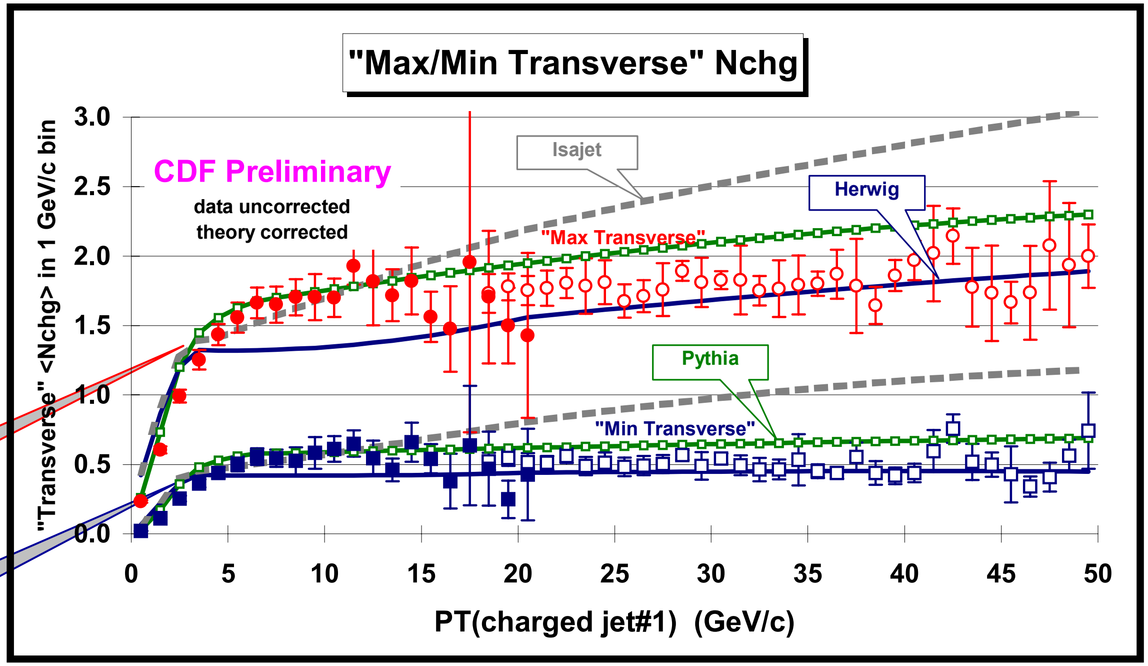


To be Blessed

- Define "TransMAX" and "TransMIN" to be the maximum and minimum of the region $60^o<\Delta\phi<120^o$ ($60^o<-\Delta\phi<120^o$) on an event by event basis. The plot shows the average difference between the "TransMAX" PT_{sum} and the "TransMIN" PT_{sum} versus P_T(charged jet#1).
- The solid (open) points are the Min-Bias (JET20) data. The errors on the (*uncorrected*) data include both statistical and correlated systematic uncertainties.

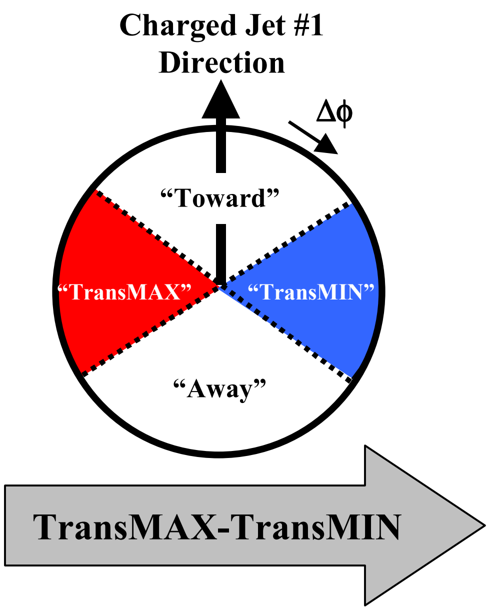
"Max/Min Transverse" Nchg versus P_T(chgjet#1)

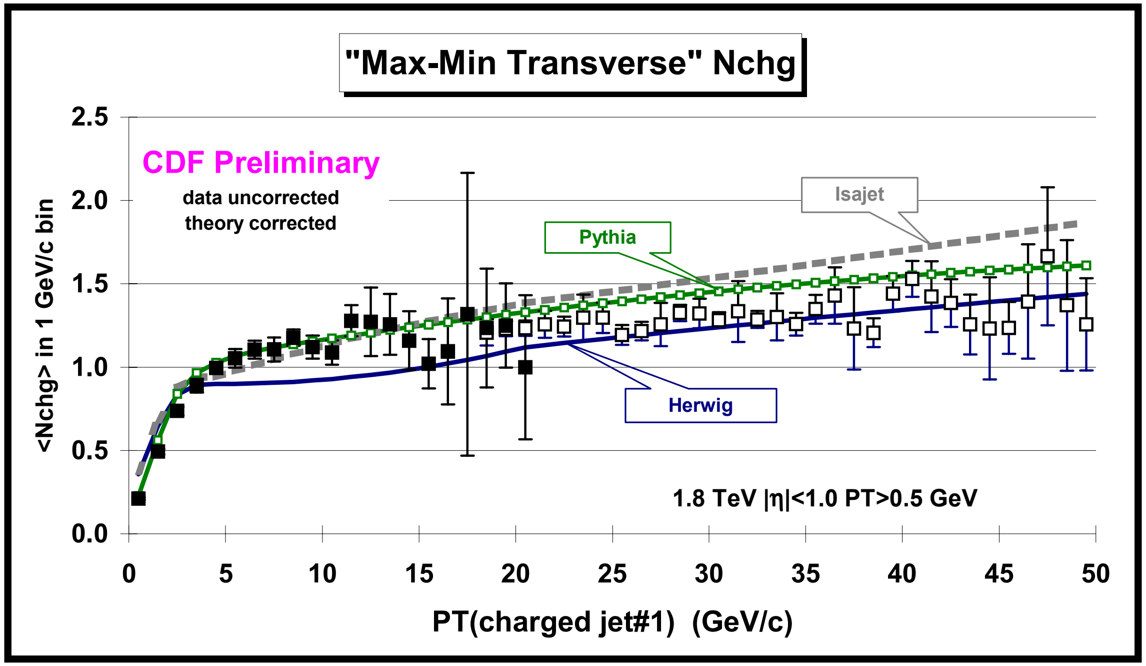




- The plot shows the data on the average "TransMAX" N_{chg} and "TransMIN" N_{chg} versus P_T(charged jet#1) compared with the QCD Monte-Carlo model predictions of Herwig 5.9, Isajet 7.32, and Pythia 6.115.
- Herwig and Isajet have their default parameters with P_T(hard) > 3 GeV/c. Pythia has been tuned (CTEQ4L, MSTP(82)=3, P_{T0}=PARP(82)=1.8 GeV/c) and has P_T(hard) > 0 GeV/c.

"Max-Min Transverse" Nchg versus P_T(chgjet#1)





- The plot shows the data on the average difference between the "TransMAX" N_{chg} and the "TransMIN" N_{chg} versus P_T(charged jet#1) compared with the QCD Monte-Carlo model predictions of Herwig 5.9, Isajet 7.32, and Pythia 6.115.
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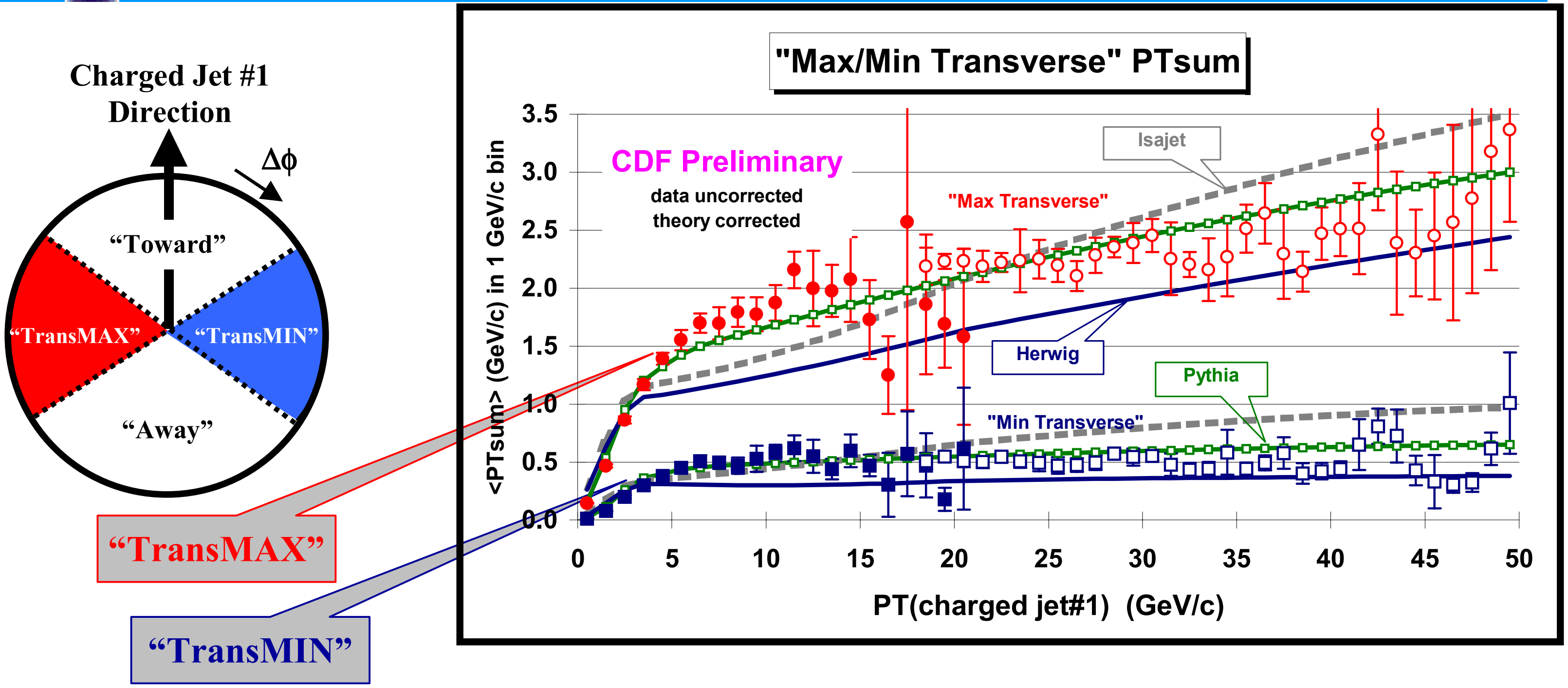
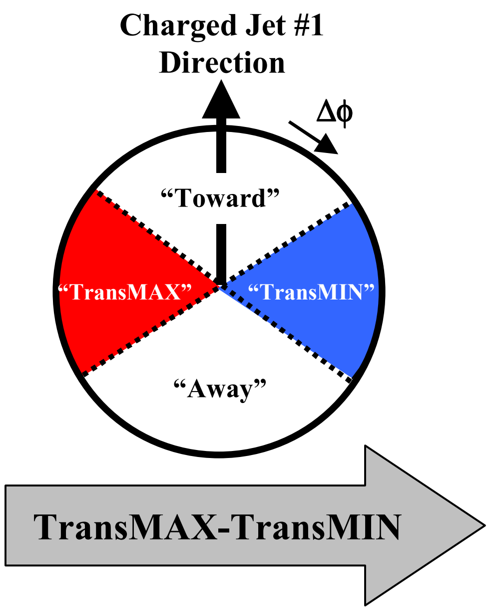
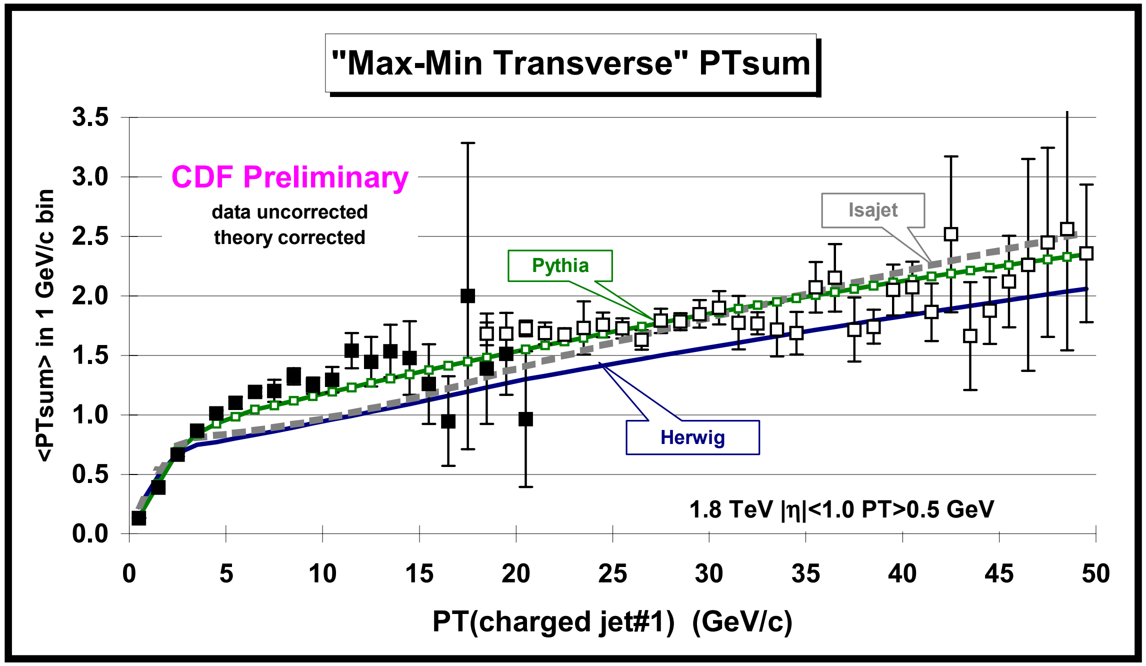
“Max/Min Transverse” PTsum versus P_T(chgjet#1)



- The plot shows the data on the average “TransMAX” PT_{sum} and “TransMIN” PT_{sum} versus P_T(charged jet#1) compared with the QCD Monte-Carlo model predictions of Herwig 5.9, Isajet 7.32, and Pythia 6.115.
- Herwig and Isajet have their default parameters with P_T(hard) > 3 GeV/c. Pythia has been tuned (CTEQ4L, MSTP(82)=3, P_{T0}=PARP(82)=1.8 GeV/c) and has P_T(hard) > 0 GeV/c.

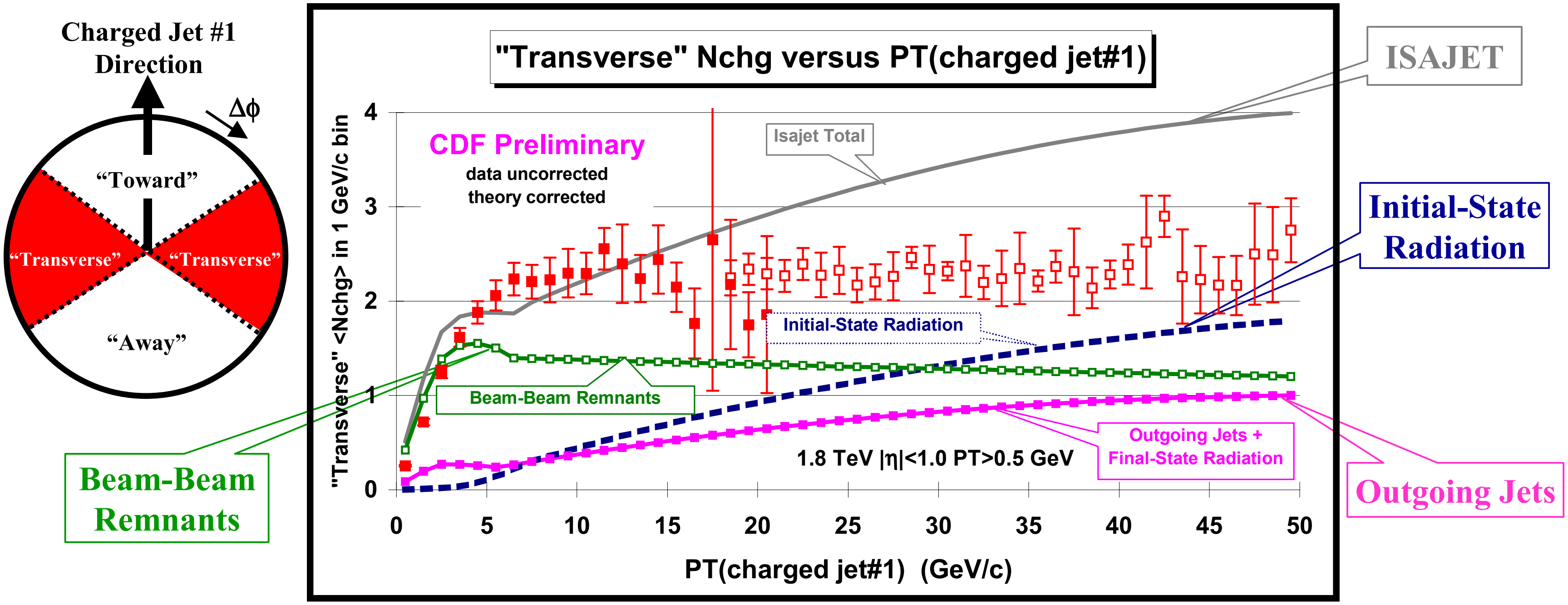
“Max-Min Transverse” PTsum versus P_T(chgjet#1)





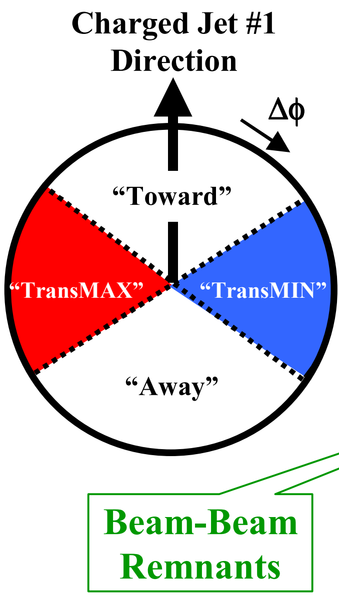
- The plot shows the data on the average difference between the “TransMAX” PT_{sum} and the “TransMIN” PT_{sum} versus P_T(charged jet#1) compared with the QCD Monte-Carlo model predictions of Herwig 5.9, Isajet 7.32, and Pythia 6.115.
- Herwig and Isajet have their default parameters with P_T(hard) > 3 GeV/c. Pythia has been tuned (CTEQ4L, MSTP(82)=3, P_{T0}=PARP(82)=1.8 GeV/c) and has P_T(hard) > 0 GeV/c.

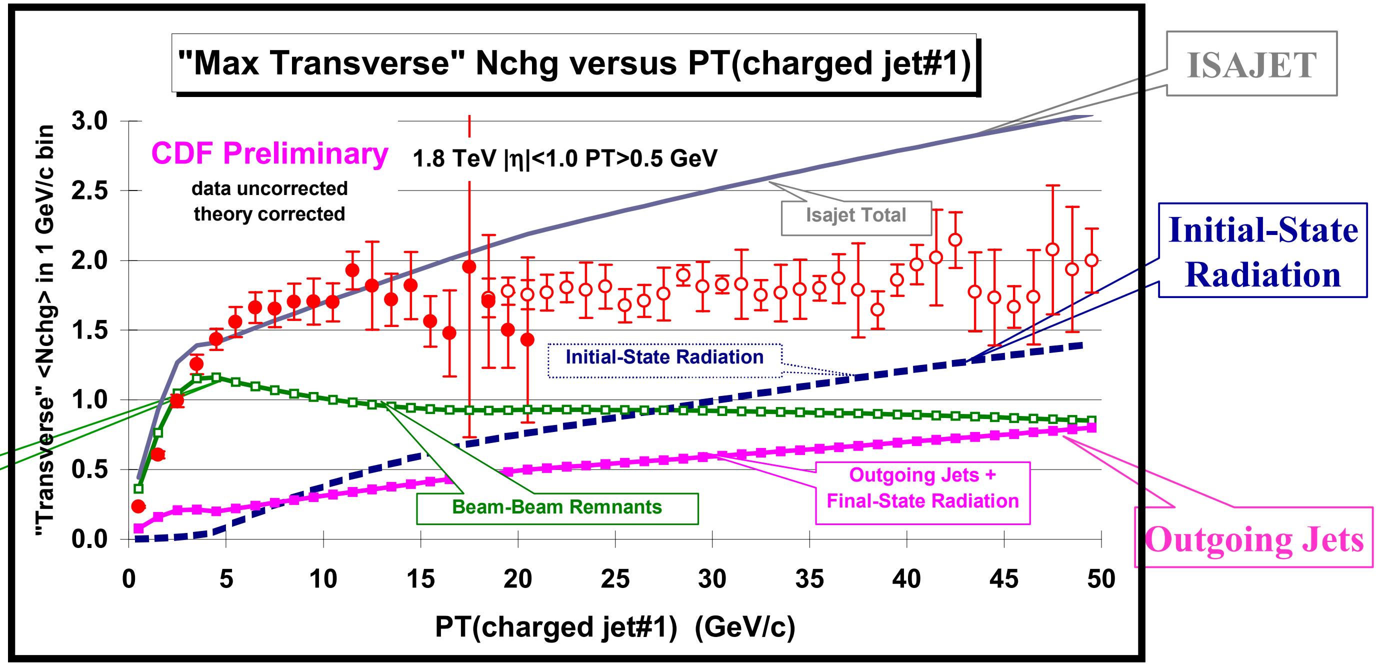
ISAJET: "Transverse" Nchg versus P_T(chgjet#1)



- Plot shows the "transverse" $<N_{chg}>$ vs P_T(chgjet#1) compared to the QCD hard scattering predictions of ISAJET 7.32 (default parameters with P_T(hard)>3 GeV/c) .
- The predictions of ISAJET are divided into three categories: charged particles that arise from the break-up of the beam and target (beam-beam remnants), charged particles that arise from initial-state radiation, and charged particles that result from the outgoing jets plus final-state radiation.

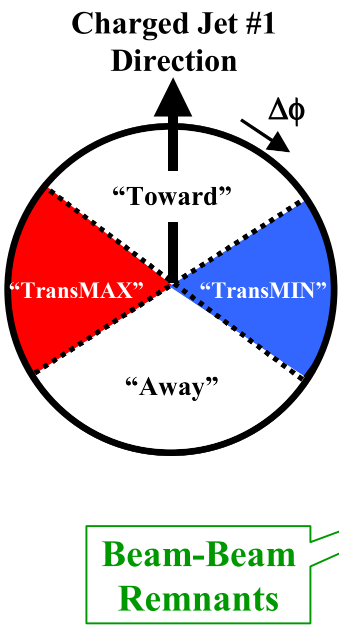
ISAJET: "TransMAX" Nchg versus P_T(chgjet#1)

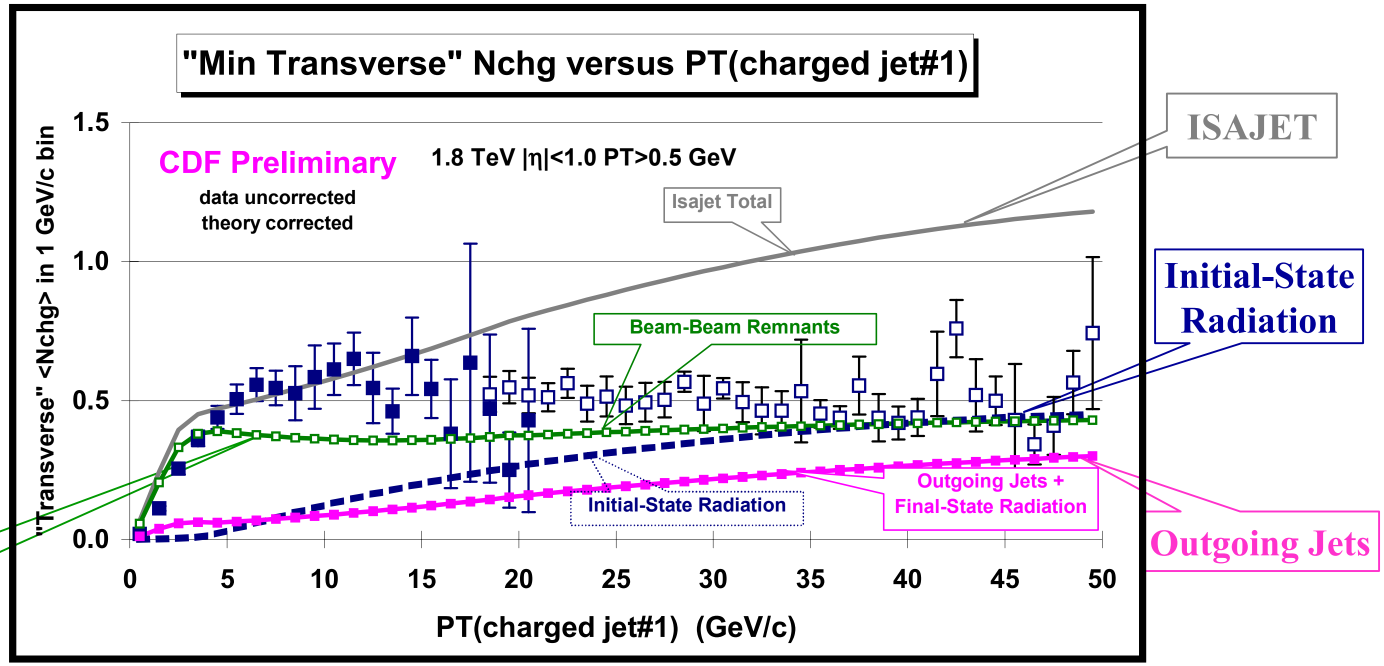




- Plot shows the "transMAX" $<N_{chg}>$ vs P_T(chgjet#1) compared to the QCD hard scattering predictions of ISAJET 7.32 (default parameters with P_T(hard)>3 GeV/c) .
- The predictions of ISAJET are divided into three categories: charged particles that arise from the break-up of the beam and target (beam-beam remnants), charged particles that arise from initial-state radiation, and charged particles that result from the outgoing jets plus final-state radiation.

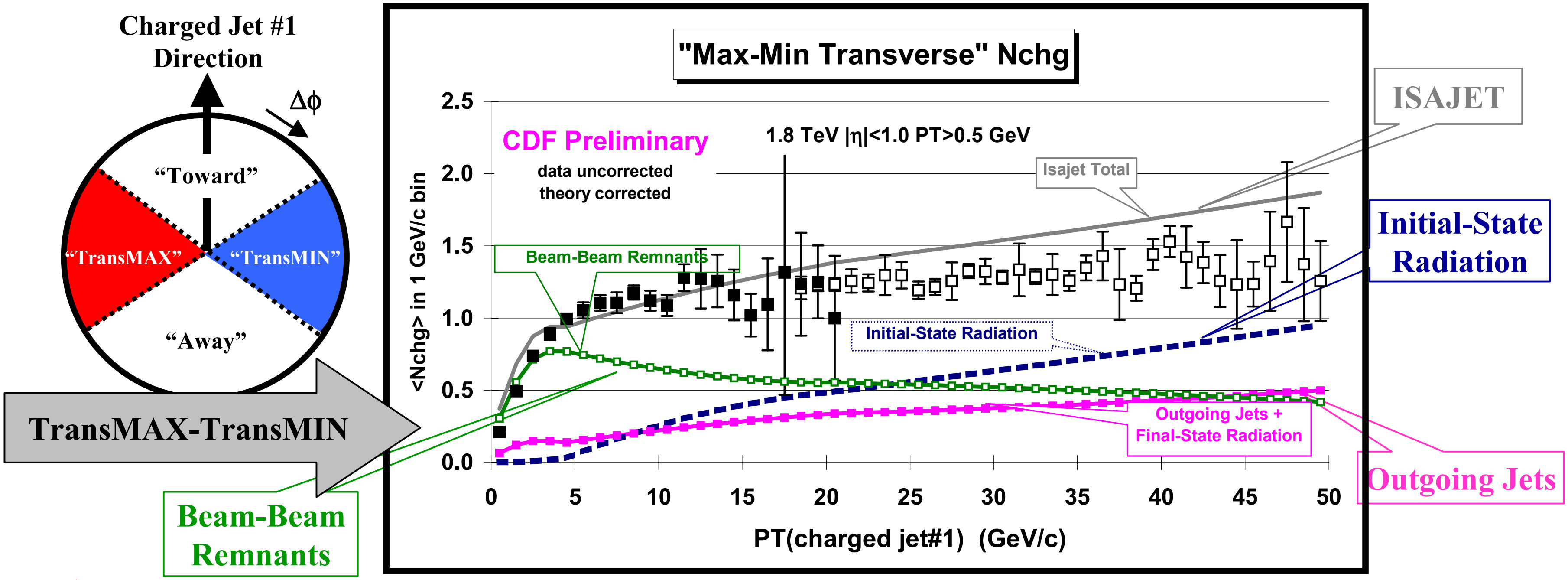
ISAJET: "TransMIN" Nchg versus P_T(chgjet#1)





- Plot shows the "transMIN" $<N_{chg}>$ vs P_T(chgjet#1) compared to the QCD hard scattering predictions of ISAJET 7.32 (default parameters with P_T(hard)>3 GeV/c) .
- The predictions of ISAJET are divided into three categories: charged particles that arise from the break-up of the beam and target (beam-beam remnants), charged particles that arise from initial-state radiation, and charged particles that result from the outgoing jets plus final-state radiation.

ISAJET: "TransDIF" Nchg versus P_T(chgjet#1)



- Plot shows the difference between the "transMAX" and "transMIN" $<N_{chg}>$ vs P_T(chgjet#1) compared to the QCD hard scattering predictions of ISAJET 7.32 (default parameters with P_T(hard)>3 GeV/c) .
- The predictions of ISAJET are divided into three categories: charged particles that arise from the break-up of the beam and target (beam-beam remnants), charged particles that arise from initial-state radiation, and charged particles that result from the outgoing jets plus final-state radiation.